IN THE CLAIMS:

1.-43. (Cancelled)

44. (Original) A method for locating regions of a target image that match a template image with respect to color characterization, the method comprising:

automatically determining color features of the template image;

locating one or more regions of the target image that match the color features of the template image.

45. (Currently Amended) The method of claim 44, further comprising:

generating information specifying a location for each region of the target image that [[is]] matches the color features of the template image.

46. (Original) The method of claim 44, further comprising:

for at least one region of the target image that matches the color features of the template image, displaying information on a graphical user interface indicating a location of the region within the target image.

47. (Original) The method of claim 44, further comprising:

for at least one region of the target image that matches the color features of the template image, displaying information on a graphical user interface indicating a degree to which color information of the region matches color information of the template image.

48. (Original) The method of claim 44, further comprising:

receiving the target image;

wherein the target image is received from one of the group consisting of:

a memory medium, a hardware device, and a software application.

49. (Original) The method of claim 44,

wherein either of the template image or the target image is a portion of a larger image.

50. (Original) The method of claim 44, wherein said locating one or more regions of the target image that match the color features of the template image comprises searching through the target image to find the one or more regions, the method further comprising:

receiving user input specifying search criteria to use in searching through the target image;

wherein the user input determines one or more parameters affecting said searching through the target image.

51. (Original) The method of claim 44,

wherein said locating one or more regions of the target image that match the color features of the template image comprises performing multiple search passes through the target image according to a coarse-to-fine search heuristic.

52. (Original) The method of claim 44,

wherein said locating one or more regions of the target image that match the color features of the template image comprises:

performing a first-pass search through the target image to find initial match candidate areas;

performing one or more subsequent search passes in which proximal regions proximal to the candidate areas are searched in order to find a best-matching region in the proximal region.

53. (Original) The method of claim 44,

wherein said automatically determining color features of the template image comprises performing a color characterization analysis of the template image;

wherein said locating one or more regions of the target image that match the color features of the template image comprises searching for regions of the target image having a

color characterization that matches, at least to a degree, the color characterization of the template image.

54. (Original) The method of claim 53, wherein said searching for regions of the target image comprises:

performing a color characterization analysis for a plurality of regions within the target image to generate color characterization information for each of the target image regions;

comparing the color characterization information of the template image with the color characterization information for each of the target image regions;

determining one or more target image regions having a color characterization that matches, at least to a degree, the color characterization of the template image.

55. (Original) The method of claim 54, further comprising:

determining a step size;

wherein said searching for regions of the target image having a color characterization that matches, at least to a degree, the color characterization of the template image comprises determining locations for the plurality of regions within the target image for which the color characterization analysis is performed;

wherein the step size is used in said determining locations for the plurality of regions within the target image.

56. (Original) The method of claim 54,

wherein the color characterization analysis performed for the template image and the color characterization analyses performed for each of the plurality of regions of the target image comprise:

examining color information of at least a subset of pixels;

assigning each examined pixel to a color category that corresponds to a portion of a color space;

determining information indicative of the allocation of the examined pixels across color categories;

wherein, for each of the plurality of regions of the target image, said searching comprises comparing the information obtained in the color characterization analysis of the region to the information obtained in the color characterization analysis of the template image in order to determine whether the region has a color characterization that matches, at least to a degree, the color characterization of the template image.

57. (Original) The method of claim 56, further comprising:

determining a sub-sampling size;

wherein the sub-sampling size is used to determine the size of the at least a subset of pixels examined for each of the plurality of regions of the target image.

58. (Original) The method of claim 56,

wherein the color characterization analysis performed for the template image comprises examining color information of each pixel in the template image;

wherein the color characterization analyses performed for each of the plurality of regions of the target image comprise examining color information of only a subset of the pixels in the region.

59. (Original) The method of claim 56,

wherein the template image and the target image comprise hue, saturation, and intensity (HSI) color information;

wherein said examining color information of at least a subset of pixels comprises examining HSI information of the at least a subset of pixels;

wherein said assigning each examined pixel to a color category that corresponds to a portion of a color space comprises assigning each examined pixel to a color category that corresponds to a portion of HSI color space.

60. (Original) The method of claim 59, further comprising:

converting either of the template image or the target image to HSI format.

61. (Original) The method of claim 59,

wherein said assigning each examined pixel to a color category that corresponds to a portion of HSI color space further comprises:

determining if the examined pixel can be categorized as either black, gray, or white based on one or more of saturation and intensity values of the respective pixel;

assigning the examined pixel to a black, gray, or white category if the examined pixel can be categorized as black, gray, or white, respectively;

determining a color category for the examined pixel based on one or more of hue and saturation values of the examined pixel, if the examined pixel cannot be categorized as either black, gray, or white.

62. (Original) The method of claim 56, further comprising:

receiving user input specifying a desired color sensitivity level to use in locating target image regions that match the template image;

wherein the user input determines a number of categories into which the color space is divided.

63. (Original) The method of claim 56,

wherein said comparing information obtained in the color characterization analysis of each region of the target image to information obtained in the color characterization analysis of the template image comprises:

for each color category of the color space, comparing the percentage of template image pixels assigned to the color category to the percentage of target image region pixels assigned to the color category.

64. (Original) The method of claim 56,

wherein the color characterization analysis performed for the template image further comprises determining one or more dominant color categories, wherein the one or more dominant color categories are assigned a relatively larger proportion of examined pixels, with respect to other color categories of the color space.

65. (Original) The method of claim 64,

wherein said comparing information obtained in the color characterization analysis of each region of the target image to information obtained in the color characterization analysis of the template image comprises:

for each dominant color category, comparing the percentage of template image pixels assigned to the dominant color category to the percentage of target image region pixels assigned to that color category.

66. (Original) The method of claim 56,

wherein the color characterization analysis performed for each of the plurality of regions of the target image further comprises performing a smoothing operation after said assigning each examined pixel to a color category;

wherein the smoothing operation comprises:

for each respective color category of at least a subset of the possible color categories, re-distributing a portion of the pixels assigned to the respective color category to one or more neighboring color categories.

67. (Original) A computer-implemented method for locating regions of a target image that match a template image with respect to color characterization, wherein the target image and the template image each comprise color information, the method comprising:

performing a first-pass search through the target image in order to find color match candidate areas;

for each color match candidate area found in the first-pass search, searching a proximal region proximal to the color match candidate area in order to find a best-matching region in the proximal region.

68. (Original) The method of claim 67, wherein said performing the first-pass search through the target image comprises:

determining a plurality of sample regions at which to sample the color information of the target image;

for each of the plurality of sample regions, determining a measure of difference between the color information of the sample region and the color information of the template image;

for each of the plurality of sample regions, designating the sample region as a color match candidate area if the measure of difference between the color information of the sample region and the color information of the template image is smaller than a threshold value.

69. (Original) The method of claim 68, further comprising:

performing a color characterization analysis of the template image;

for each of the plurality of sample regions, performing a color characterization analysis of the sample region;

wherein said determining the measure of difference between the color information of each sample region and the color information of the template image comprises comparing information obtained in the color characterization analysis of the sample region with information obtained in the color characterization analysis of the template image.

70. (Original) The method of claim 69,

wherein the template image and the target image each comprise a plurality of pixels;

wherein the color characterization analysis performed for the template image and the color characterization analyses performed for each of the plurality of sample regions comprise:

examining color information of at least a subset of pixels;

assigning each examined pixel to a color category that corresponds to a portion of a color space;

determining information indicative of the allocation of the examined pixels across color categories;

wherein said comparing information obtained in the color characterization analysis of the sample region with information obtained in the color characterization analysis of the template image comprises comparing the allocations of the examined pixels across color categories for the sample region and the template image, respectively.

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71. (Original) The method of claim 70,

wherein the color characterization analysis performed for the template image further comprises determining one or more dominant color categories, wherein the one or more dominant color categories are assigned a relatively larger proportion of examined pixels, with respect to other color categories of the color space;

wherein said comparing information obtained in the color characterization analysis of the sample region with information obtained in the color characterization analysis of the template image comprises comparing the dominant color categories of the sample region and the template image, respectively.

72. (Original) The method of claim 70,

wherein the color characterization analysis performed for the template image comprises examining color information of each pixel in the template image;

wherein the color characterization analyses performed for each of the plurality of sample regions comprise examining color information of only a subset of the pixels in the sample region.

73. (Original) The method of claim 70,

wherein the color information of the template image and the color information of the target image comprise hue, saturation, and intensity (HSI) color information;

wherein said examining color information of at least a subset of pixels comprises examining HSI information of the at least a subset of pixels;

wherein said assigning each examined pixel to a color category that corresponds to a portion of a color space comprises assigning each examined pixel to a color category that corresponds to a portion of HSI color space.

74. (Original) The method of claim 68, the method further comprising:

determining a first step size to use in said performing the first-pass search through the target image;

determining a second step size, wherein the second step size is smaller than the first step size;

wherein said searching proximal regions proximal to the color match candidate areas uses the second step size.

75. (Original) The method of claim 67,

wherein said searching the proximal region proximal to the color match candidate area in order to find a best-matching region in the proximal region comprises:

determining a plurality of sample regions in the proximal region at which to sample the color information of the target image;

for each of the plurality of sample regions in the proximal region, determining a measure of difference between the color information of the sample region and the color information of the template image;

wherein the best-matching region in the proximal region is a sample region with a smallest measure of difference.

76. (Original) The method of claim 67, further comprising:

for each best-matching region found, determining a measure of difference between the color information of the region and the color information of the template image;

designating at least a subset of the best-matching regions as final match regions;

wherein for each best-matching region designated as a final match region, the measure of difference between the color information of the final match region and the color information of the template image is less than a threshold value.

77. (Original) A system for locating regions of a target image that match a template image with respect to color and pattern information, the system comprising:

a processor;

a memory medium coupled to the processor, wherein the memory medium stores color match location software;

wherein the processor is operable to execute the color match location software to:

automatically determine color features of the template image;

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locate one or more regions of the target image that match the color features of the template image.

78. (Original) The system of claim 77, further comprising:

a display device;

wherein, for each region of the target image that is determined to match the color features of the template image, the processor is operable to display information on a graphical user interface indicating a location of the region within the target image.

79. (Original) The system of claim 77,

wherein the processor is operable to execute the color match location software to receive the target image from one of:

a memory medium and a hardware device.

80. (Original) The system of claim 77,

wherein, in automatically determining color features of the template image, the processor is operable to perform a color characterization analysis of the template image.

81. (Original) The system of claim 80,

wherein, in locating one or more regions of the target image that match the color features of the template image, the processor is operable to search for regions of the target image having a color characterization that matches, at least to a degree, the color characterization of the template image;

wherein said searching for regions of the target image comprises performing a color characterization analysis for a plurality of regions within the target image.

82. (Original) The system of claim 81,

wherein the color characterization analysis performed for the template image and the color characterization analyses performed for each of the plurality of regions of the target image comprise:

examining color information of at least a subset of pixels;

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assigning each examined pixel to a color category that corresponds to a portion of a color space;

determining information indicative of the allocation of the examined pixels across color categories;

wherein, for each of the plurality of regions of the target image, said searching comprises comparing the information obtained in the color characterization analysis of the region to the information obtained in the color characterization analysis of the template image in order to determine whether the region has a color characterization that matches, at least to a degree, the color characterization of the template image.

83. (Original) The system of claim 82,

wherein the template image and the target image comprise hue, saturation, and intensity (HSI) color information;

wherein said examining color information of at least a subset of pixels comprises examining HSI information of the at least a subset of pixels;

wherein said assigning each examined pixel to a color category that corresponds to a portion of a color space comprises assigning each examined pixel to a color category that corresponds to a portion of HSI color space.

84. (Original) The system of claim 82,

wherein said comparing information obtained in the color characterization analysis of each region of the target image to information obtained in the color characterization analysis of the template image comprises:

for each color category of the color space, comparing the percentage of template image pixels assigned to the color category to the percentage of target image region pixels assigned to the color category.

85. (Original) The system of claim 82, wherein said assigning each examined pixel to a color category comprises:

determining contributions which the pixel should make to a plurality of color categories;

distributing the weight of the pixel across the plurality of color categories in accordance with the determined contributions.

86. (Original) The system of claim 77,

wherein, in locating one or more regions of the target image that match the color features of the template image, the processor is operable to perform multiple search passes according to a coarse-to-fine search heuristic.

87. (Original) The system of claim 77,

wherein, in locating one or more regions of the target image that match the color features of the template image, the processor is operable to:

perform a first-pass search through the target image to find initial match candidate areas;

perform one or more subsequent search passes in which proximal regions proximal to the candidate areas are searched in order to find a best-matching region in the proximal region.

88. (Original) A memory medium for locating regions of a target image that match a template image with respect to color characterization, the memory medium comprising program instructions executable to:

automatically determine color features of the template image;

locate one or more regions of the target image that match the color features of the template image.

89. (Original) The memory medium of claim 88, further comprising program instructions executable to:

for at least one region of the target image that matches the color features of the template image, display information on a graphical user interface indicating a location of the region within the target image.

90. (Original) The memory medium of claim 88,

wherein either of the template image or the target image is a portion of a larger image.

91. (Original) The memory medium of claim 88, wherein said locating one or more regions of the target image that match the color features of the template image comprises searching through the target image to find the one or more regions, the memory medium further comprising program instructions executable to:

receive user input specifying search criteria to use in searching through the target image;

wherein the user input determines one or more parameters affecting said searching through the target image.

92. (Original) The memory medium of claim 88,

wherein said locating one or more regions of the target image that match the color features of the template image comprises performing multiple search passes through the target image according to a coarse-to-fine search heuristic.

93. (Original) The memory medium of claim 88,

wherein said locating one or more regions of the target image that match the color features of the template image comprises:

performing a first-pass search through the target image to find initial match candidate areas;

performing one or more subsequent search passes in which proximal regions proximal to the candidate areas are searched in order to find a best-matching region in the proximal region.

94. (Original) The memory medium of claim 88,

wherein said automatically determining color features of the template image comprises performing a color characterization analysis of the template image;

wherein said locating one or more regions of the target image that match the color features of the template image comprises searching for regions of the target image having a

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color characterization that matches, at least to a degree, the color characterization of the template image.

95. (Original) The memory medium of claim 94, wherein said searching for regions of the target image comprises:

performing a color characterization analysis for a plurality of regions within the target image to generate color characterization information for each of the target image regions;

comparing the color characterization information of the template image with the color characterization information for each of the target image regions;

determining one or more target image regions having a color characterization that matches, at least to a degree, the color characterization of the template image.

96. (Original) The memory medium of claim 95,

wherein the color characterization analysis performed for the template image and the color characterization analyses performed for each of the plurality of regions of the target image comprise:

examining color information of at least a subset of pixels;

assigning each examined pixel to a color category that corresponds to a portion of a color space;

determining information indicative of the allocation of the examined pixels across color categories;

wherein, for each of the plurality of regions of the target image, said searching comprises comparing the information obtained in the color characterization analysis of the region to the information obtained in the color characterization analysis of the template image in order to determine whether the region has a color characterization that matches, at least to a degree, the color characterization of the template image.

97. (Original) A computer-implemented method for locating regions of a target image that match a template image with respect to color characterization, wherein the target image and the template image each comprise a plurality of pixels, the method comprising:

performing a color characterization analysis of the template image; and

searching for regions of the target image having a color characterization that matches, at least to a degree, the color characterization of the template image;

wherein said searching for regions of the target image comprises performing a color characterization analysis for a plurality of regions within the target image;

wherein the color characterization analysis performed for the template image and the color characterization analyses performed for each of the plurality of regions of the target image comprise:

examining color information of at least a subset of pixels;

assigning each examined pixel to a color category that corresponds to a portion of a color space;

determining information indicative of the allocation of the examined pixels across color categories;

wherein, for each of the plurality of regions of the target image, said searching comprises comparing the information obtained in the color characterization analysis of the region to the information obtained in the color characterization analysis of the template image in order to determine whether the region has a color characterization that matches, at least to a degree, the color characterization of the template image.